REMARKS

Claims 1, 7 and 8 are pending. Claim 1 has been amended to recite the subject matter of canceled claim 4.

No new matter has been added by way of the above-amendment.

Prior Art Based Rejection

The Examiner has withdrawn the anticipation rejection based on the July 30, 2009 Amendment. However, the Examiner has imposed a new rejection based on obviousness. Claims 1, 4, 7 and 8 stand rejected under 35 U.S.C. §103(a) as being obvious over US Patent Publication 2003/0059618 to Takai (hereinafter "Takai") in view of Kawamura et al. (US 2002/0117066). Applicants respectfully traverse the rejection.

1. Takai teaches multiple inventions (Invention I-III) which are not interchangeable

The Examiner stated in lines 5-3 from the bottom on page 2 in the Office Action that Takai teaches a composition comprising an epoxy resin composition and a cationic polymerization initiator (paras. 35-36) which releases a cation species upon heating to initiate cationic polymerization (para. 31, 33).

However, Takai teaches more than one invention, ***Inventions I-III***.

In Takai, ***Invention I*** relates to an alicyclic epoxy compound which is useful for use in coatings, inks, adhesives, sealants, encapsulants, stabilizers or the like; ***Invention II*** relates to an epoxy resin composition which can be cured by heating, thereby obtaining a cured product having good moisture and heat resistance and transparency, and applications thereof for photosemiconductor encapsulation; and ***Invention III*** relates to an ultraviolet ray-curable can-coating composition, which can be cured by ultraviolet irradiation, thereby forming a

coating film having excellent film performance such as processability, adhesion, hardness and scratch resistance, particularly excellent outer appearance and retort resistance of films.

This description in paragraphs 35-36 which the Examiner relies on relates to a twelfth aspect corresponding to ***Invention III***. In the twelfth aspect, it is clearly shown that an ultraviolet rays-curable can-coating composition comprises a cationic polymerization initiator (G) which generates a cation by ultraviolet irradiation.

However, the description in paragraph 31 which the Examiner relies on relates to a seventh aspect corresponding to ***Invention II***, the description in paragraph 33 which the Examiner relies on relates to a ninth aspect corresponding to ***Invention II***, and the descriptions on curing by heating in the ABSTRACT relates to ***Invention II***.

Therefore, these descriptions in paragraphs 31 and 33 do **not** relate to Takai's ***Invention III*** corresponding to a twelfth aspect using a copolymer (F) and are not combinable as the Examiner has done.

Takai teaches in paras. 181-182 that

> *"The ultraviolet rays-curable can-coating composition of* ***the invention III*** *contains the alicyclic epoxy compound (A) having alicyclic epoxy group and not having ester linkage in the molecule, the compound having alicyclic epoxy group and ester linkage in the molecule and/or epoxy compound (B) having glycidyl group, and the copolymer (F) as film-forming resin components, and can efficiently be cured by cationic polymerization even by ultraviolet irradiation in low irradiation dose in the presence of the cationic polymerization initiator (G), without requiring facilities such as nitrogen sealing. The coating film obtained from the composition are excellent in film performances, such as processability, adhesiveness, hardness and scratch resistance, which are required even for a thin film as a can coating material. Further, the coating composition*

can also form a coating film having excellent film appearance and retort resistance.

Therefore, the coating composition of ***the invention III*** *is particularly suitable for use as a coating material for outer surface of a can".* (Emphasis added).

Further, Takai teaches that "*Copolymer (F) for use in the coating composition of the* ***invention III*** *is a copolymer having at least one glycidyl group and/or alicyclic epoxy group in the molecule.*" in para. 134, and that "*Cationic polymerization initiator (G) used in the* ***invention III*** *is a compound that generates cation by ultraviolet irradiation, thereby initiating polymerization.*" in para. 145. (Emphasis added).

Accordingly, Takai does **not** teach or suggest in ***Invention III*** a thermosetting resin composition, comprising specific amounts of an ester-free alicyclic epoxy compound (A) having two alicyclic epoxy groups and no ester bond per molecule and an epoxy-containing acrylic resin (D) together with a cationic polymerization initiator which releases a cation species upon heating to initiate cationic polymerization, as presently claimed.

On the other hand, the present invention has been achieved based on the findings that a thermosetting resin composition, comprising specific amounts of an ester-free alicyclic epoxy compound (A) having two alicyclic epoxy groups and no ester bond per molecule and an epoxy-containing acrylic resin (D), is used as a resin composition for a replacement typically for glass substrates which is excellent in heat resistance, dimensional stability, and optical transparency.

Invention III of Takai does **not** teach or suggest the present object which provides a thermosetting resin composition that can yield a replacement typically for glass substrates which is excellent in heat resistance, dimensional stability, and optical transparency.

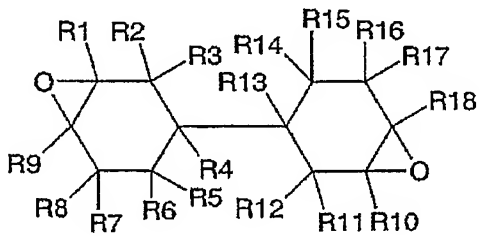
In the present invention, unexpected results of high heat resistance, high dimensional stability, and high optical transparency are obtained with:

A thermosetting resin composition comprising 100 parts by weight of an epoxy composition (E) and 0.01 to 20 parts by weight of a cationic polymerization initiator (C) which is a compound that forms a cationic compound as a result of heating so as to initiate polymerization, and 1 to 11.1 parts by weight of an epoxy-containing acrylic resin (D) different from the components (A) and (B) to 100 parts by weight of the epoxy composition (E),

wherein the epoxy-containing resin (D) includes a polymerization inhibitor and wherein the epoxy-containing resin (D) is prepared by polymerizing an epoxy-containing monomer including compounds each having a glycidyl group or a terminal epoxy group analogous to the glycidyl group and wherein the epoxy group content of the epoxy-containing acrylic resin (D) is 4% to 12%, in terms of oxirane oxygen content,

the epoxy composition (E) comprising 10 to 99 percent by weight of an ester-free alicyclic epoxy compound (A) having two alicyclic epoxy groups and no ester bond per molecule; and 90 to 1 percent by weight of another epoxy compound (B) differing from the epoxy compound (A), the total of (A) and (B) being 100 percent by weight, and

wherein the ester-free alicyclic epoxy compound (A) is an epoxy compound represented by Structural Formula (1):



(1)

wherein R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, and R18 may be the same as or different from one another and are each hydrogen atom, a halogen atom, a hydrocarbon group which may

comprise oxygen atom or a halogen atom, or a substituted or unsubstituted alkoxy group.

2. Takai's Invention II involves curing by heating but does not contain an acrylic copolymer (F) having a glycidyl group in the molecule

Among ***Inventions I-III***, an acrylic copolymer (F) having a glycidyl group in the molecule is only used in the coating composition of ***Invention III*** (Takai, para. 134) corresponding to a twelfth aspect of Takai.

Although an initiator which releases a cation species upon heating to initiate cationic polymerization is described in Takai's para. 31, a liquid epoxy resin composition according to the fifth or six aspect described in para. 31 does **not** contain an acrylic copolymer (F) having a glycidyl group in the molecule.

Also, in ***Invention II*** of Takai, transparency of the composition is in the range of 88.9-95.7, however, the Heat Resistance (as measured by taking the glass transition temperature of a piece which has been thermally cured, see para. 208) is in the range of 141-155C, which is extremely low, as shown in TABLE II-2.

Accordingly, ***Invention II*** of Takai does **not** teach or suggest the present object of to provide a thermosetting resin composition that can yield a replacement typically for glass substrates which is excellent in heat resistance, dimensional stability, and optical transparency.

3. Amount of Epoxy-containing acrylic resin (D), having at least one glycidyl group and/or alicyclic epoxy group in the molecule

Additionally, as the Examiner stated in lines 4-8 on page 3 in the Office Action, Takai teaches a compound of a copolymer (F), corresponding to the present epoxy-containing acrylic resin (D), having at least one glycidyl group and/or alicyclic epoxy group in the molecule in an amount of 5-20 parts by weight to 100 parts by weight of the sum of the two epoxy compounds (para. 175). ***However***, in Examples III-1 to III-7 of Takai, the amounts of the compound produced in Production Example III-1 or III-2 as copolymer (F) are 20 to 91 parts as shown in Table III-2 which is provided below (in part).

It seems that the amount of the copolymer (F) of 5-20 parts disclosed in Takai is **incorrect**. This is because the Examples of Invention III of Takai et al. in Table III-2 show that only one of the Examples 1-7 fall within the range of 5-20 parts, as shown below.

Table III-2 (in part)

Example III in Takai	-1	-2	-3	-4	-5	-6	-7
E=A+B : 1)-4)	100	100	70	105	55	95	55
D : Production Example III-1, III-2	30	20	25	-	50	20	40
Amount of D	**30**	**20**	**33**	**-**	**91**	**21**	**73**

As such, the skilled artisan would either not give credence to the lower end of the range of 5-20 parts or not rely on the range of 5-20 parts at all. Applicants respectfully submit that there is no overlap with the presently claimed range of 1 to 11.1 parts

4. Oxirane oxygen concentration

The Examiner has taken the position that Takai teaches the concentration of epoxy groups in the copolymer is 0.1-7.0 equivalents/kg (para. 175), see lines 12-13 on page 3 in the Office Action.

However, Applicants respectfully submit that the calculation by the Examiner is **not** correct, and the concentrations of epoxy groups in the copolymer disclosed in Takai of *0.1-7.0 equivalents/kg* and *0.2-5.0 equivalents/kg* are calculated 0.23-16.0% and 0.32-8.0% oxirane oxygen content as follows.

<Calculation of the oxirane oxygen content in Takai >

Concentration of epoxy groups in terms of epoxy equivalents is the weight of the resin containing 1 mol of epoxy group. For example, when *the concentration of epoxy groups in terms of epoxy equivalents* is 7.0 equivalents/kg, 1 mol of oxygen is contained in 7 kg of resin. Therefore, the weight of the oxirane oxygen (g) in 100g of resin is calculated as 1/7000×100×16=1600/7000.

That is to say, *Epoxy group content in terms of oxirane oxygen content (X)* is calculated from *Concentration of epoxy groups in terms of epoxy equivalents (Y)* by using the following Formula.

$$X\ (wt\%) = 1600 / Y\ (g/mol)$$

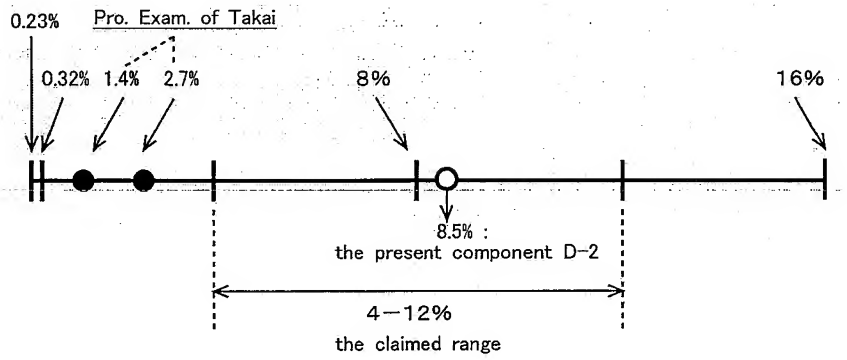
Therefore, when *the concentration of epoxy groups in terms of epoxy equivalents (Y)* is 7.0 equivalents/kg, *an epoxy group content in terms of oxirane oxygen content (X)* is $(1600/7)\times10^{-3}$=0.23, and similarly, when *the concentration of epoxy groups in terms of epoxy*

equivalents (Y) is 0.1, 5.0, or 0.2 equivalents/kg, *an epoxy group content in terms of oxirane oxygen content (X)* is $(1600/0.1)\times10^{-3}$=16.0, $(1600/5.0)\times10^{-3}$=0.32, or $(1600/0.2)\times10^{-3}$=8.0.

Therefore, the description "Concentration of epoxy group in the copolymer (F) is 0.1 to 7.0 equivalents/kg, preferably 0.2 to 5.0 equivalents/kg." in para. 142 of Takai can be read as "Concentration of epoxy group in the copolymer (F) is 0.23-16.0% oxirane oxygen content, preferably 0.32-8.0% oxirane oxygen content.

In TABLE III-1, Takai teaches Oxirane oxygen concentration of 1.4% and 2.7% for copolymers of Production Examples III-1 and III-2.

On the other hand, the claimed range is 4-12%. As shown below, the claimed range of Oxirane oxygen concentration differs from that of Takai, and unexpected results of the optically transparent materials excelled in optical transparency, heat resistance, and dimensional stability are obtained.



5. Transparency

The Examiner has made certain observations regarding the transparency as shown by the Examples in the present specification. The Examiner states that in the comparative

example 1 of the instant specification, the property of high optical transparency has a higher value than that in examples 4 and 6. However, in the comparative example 1, Glass transition point and Thermal decomposition temperature are low, and Coefficient of cubic expansion is high. Therefore, the thermosetting resin composition of the comparative example 1 is overall disadvantageous when compared to the inventive examples.

Furthermore, the transparency described in **Takai** 's TABLE II-2 of Invention II is in the range of 88.9-95.7, however, the Heat Resistance (as measured by taking the glass transition temperature of a piece which has been thermally cured, see para. 208) is in the range of 141-155C which is extremely low.

6. Summary of Takai's Deficiencies

As a whole, the claimed invention particularly differs from Takai in the following features:

(i) including a cationic polymerization initiator (C) forming cation species as a result of heating so as to initiate the polymerization;

(ii) including an epoxy-containing acrylic resin (D) prepared by polymerizing an epoxy-containing monomer including compounds each having a glycidyl group or a terminal epoxy group analogous to the glycidyl group;

(iii) an amount of said epoxy-containing acrylic resin (D) is 1 to 11.1 parts by weight to 100 parts by weight of the epoxy composition (E);

(iv) the superior properties of the composition when the oxirane oxygen content is 4-12% in (D); and

(v) including a polymerization inhibitor.

Takai does not teach or suggest the composition comprising the above-mentioned features.

It is clear for the skilled person in the art that there are differences between the resin compositions for a replacement typically for glass substrates and resin compositions for coating films, although the resin composition in Takai's Invention III comprises ***an alicyclic epoxy compound (A)*** *represented by formula (I) wherein X is a single bond* ***and an acrylic copolymer (F)*** *having a glycidyl group in the molecule.*

Specifically, the present resin compositions for a replacement typically for glass substrates is required to be excellent in heat resistance, dimensional stability, and optical transparency. On the other hand, the resin composition for a coating film of ***Invention III*** of Takai must have excellent film performances such as processability, adhesion, hardness and scratch resistance, particularly film appearance and retort resistance.

Accordingly, significant patentable distinctions exist between the present invention and the teachings of Takai.

7. Kawamura et al.

The Examiner, aware of deficiencies of Takai, cites Kawamura et al. in order to cure these deficiencies. However, Applicants respectfully submit that Kawamura et al. fail to cure the deficiencies of Takai, since Kawamura et al. fail to teach features ii-iv (as discussed above) which are as follows:

(ii) including an epoxy-containing acrylic resin (D) prepared by polymerizing an epoxy-containing monomer including compounds each having a glycidyl group or a terminal epoxy group analogous to the glycidyl group;

(iii) an amount of said epoxy-containing acrylic resin (D) is 1 to 11.1 parts by weight to 100 parts by weight of the epoxy composition (E); and

(iv) the superior properties of the composition when the oxirane oxygen content is 4-12% in (D).

Furthermore, Applicants respectfully submit that the skilled person in the art would not find it obvious to modify the teachings of Takai with the teachings of Kawamura, i.e., the

combination of references is improper. As mentioned above, in Takai, ***Invention I*** relates to an alicyclic epoxy compound which is useful for use in coatings, inks, adhesives, sealants, encapsulants, stabilizers or the like; ***Invention II*** relates to an epoxy resin composition which can be cured by heating, thereby obtaining a cured product having good moisture and heat resistance and transparency, and applications thereof for photosemiconductor encapsulation; and ***Invention III*** relates to an ultraviolet ray-curable can-coating composition, which can be cured by ultraviolet irradiation, thereby forming a coating film having excellent film performance such as processability, adhesion, hardness and scratch resistance, particularly excellent outer appearance and retort resistance of films. This is in distinction to the teachings of Kawamura et al, which relate to lithographic printing plate precursors. In view of the divergent subject matter of Takai and Kawamura et al., the skilled artisan would not look to the teachings of Kawamura et al. in order to modify any of Takai's Inventions I, II or III. As such, a *prima facie* case of obviousness cannot be said to exist.

8. Conclusion

In view of the foregoing, a *prima facie* case of obviousness cannot be said to exist. As such, reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Reg. No. 43,575, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: February 12, 2010

Respectfully submitted,

By _____ GARTH M. DAHLEN USPTO #43,575

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